REMARKS

Claims 1, 3, 5, 10 and 12 are presented for examination with Claim 1 being currently amended, Claims 3, 5, 10 and 12 pending as originally filed and Claims 2, 4, 6-9, 11 and 13-14 canceled without disclaimer or prejudice. Claim 1 has been amended to correct a typographical error to change "1.0" to "1.2". Support is found in originally filed Claim 2. No new matter within the meaning of § 132 has been added by the amendment. Entry of the after-final amendment is requested because Claim 2 was previously searched and considered. The Office Action indicated that the obviousness rejection to Claims 3, 5, 10 and 12 over Yoshida *et al.* in view of Takagaki *et al.* has been withdrawn. However, the Office Action at page 3, line 3, stated that the rejection to Claims 3 and 10 over Yoshida *et al.* in view of Takagaki *et al.* remains. Clarification is requested.

35 U.S.C. § 103 rejections

(1) Yoshida *et al.* in view of Takagaki *et al.*

The Office Action maintained the rejection of Claims 1, 3 and 10 as being unpatentable over "Shinjiki-2-jigen . . .", CSJ, March 11, 2002 ("Yoshida *et al.*") in view of "Titanium Niobate . . .", Dai 90 Kai September 10, 2002 ("Takagaki *et al.*"). Although the Office Action acknowledged that Yoshida *et al.* does not describe a catalyst in which "z" has a value between 1.2 and 1.4, it was alleged that Takagaki *et al.* teaches the relationship between the Ti/Nb ratio and the structural features and acidic properties of the catalyst. See Office Action at page 4, ¶ 3. The Office Action also stated that Takagaki *et al.* teaches that the ratio of Ti and Nb indicates

strong activity in reactions with esters and that the effect of altering the ratio is taught in ¶ 2 of Takagaki *et al.* reciting "altering the ratio of Ti and Nb, and investigating the forming mechanism of acid". See English translation at page 1, ¶ 2; See Office Action at page 6, ¶ 4.

In this case, the *prima facie* case of obviousness has not been established because Takagaki *et al.* teaches away from the claimed invention. The reference teaches $H_{0.9}Ti_{0.9}Nb_{1.1}O_5$ having a higher activity than Ti/Nb=1, where the corresponding z ratio of $H_{0.9}Ti_{0.9}Nb_{1.1}O_5$ is 0.9/1.1=0.818. However, 0.818 is clearly outside the claimed range of $1.2<z<1.4$. See English translation at page 2, ¶ 3. One of ordinary skill would not have any motivation to make the claimed $1.2<z<1.4$ limitation based on Takagaki *et al.* because a z ratio is not a well known design parameter. The field of art is also unpredictable. Takagaki *et al.* suggests experimenting in an opposite direction from the claimed invention by teaching that the lower Ti/Nb ratio of 0.818 is better than a ratio of 1.0. See also Response of May 1, 2008 at pages 5-6. Takagaki *et al.* fails to teach the desirability of the specific range of $1.2<z<1.4$. Clearly, the unpredictability and teaching away of the cited reference demonstrates the unobviousness of Claim 1, and the Claims 3 and 10 containing the same limitations of Claim 1.

(2) Yoshida *et al.* or Takagaki *et al.* in view of Hara *et al.*

The Office Action rejected Claims 5 and 12 as being unpatentable over Yoshida *et al.* in view of Takagaki *et al.* and further in view of "Koteisan . . .", Shokubai, June 10, 2002, Vo. 44, No. 4 ("Hara *et al.*"). Insofar as pending Claims 5 and 12 depend on, or contain the limitations of Claim 1, the same argument over the rejection set forth in section (1) of this paper applies. It

is emphasized that one of ordinary skill in the art could not make the claimed Ti/Nb ratio from the cited references. The non-integer Ti/Nb ratio is not a known design parameter that can be easily determined by limiting the ratio to a perceived optimum range, and the claimed range is clearly not mere optimization of known variables but the result of an effort to determine what ratios between what elements unexpectedly results in improved yields.

New Ground of Rejection

The Advisory Action of September 26, 2008, made a new ground of rejection. It was argued that Takagaki *et al.* teaches a catalyst composition in Sections 2 and 3 (Results and Conclusion) where the Ti/Nb atomic ratio (z) ranges from **0.833 to 5**. However, the allegedly taught range of 0.833 to 5 relies upon different compounds in Takagaki *et al.* of $\mathbf{Cs}_{1-x}\mathrm{Ti}_{2-x}\mathrm{Nb}_{1+x}\mathrm{O}_7$ (Ti/Nb=2) or $\mathbf{K}_{3-x}\mathrm{Ti}_{5-x}\mathrm{Nb}_{1+x}\mathrm{O}_{14}$ (Ti/Nb=5) [*emphasis added*]. Notably, these compounds only form the salt of Cs or K, and not H, as in the claimed compound $\mathrm{HTi}_x\mathrm{Nb}_y\mathrm{O}_5$. Takagaki *et al.* does not evaluate the Cs and K salts as a solid acid catalyst, and hence cannot be relied upon to assert the expanded range 0.833 to 5. In the case of salts having H, the reference unequivocally teaches away from the claimed invention by suggesting that the Ti/Nb ratio of 0.818 is *better* than a ratio of 1.0, which would steer one of ordinary skill in the wrong direction. See Takagaki *et al.* in Sections 2 and 3 (Results and Conclusion); See also Response of September 16, 2008, at page 5, lines 14-19. The non-integer Ti/Nb ratio is clearly not a known design parameter. Hence, the claimed invention is unobvious.

Conclusion

In light of the foregoing, it is submitted that the application is now in condition for allowance. It is therefore respectfully requested that the rejection(s) be withdrawn and the application passed to issue.

Respectfully submitted,
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